

Napa-Sonoma Valley Groundwater Basin, Napa- Sonoma Lowlands Subbasin

Groundwater Basin Number: 2-2.03

County: Napa, Solano

Surface Area: 40,500 acres (65 square miles)

Basin Boundaries and Hydrology

The Napa-Sonoma Lowlands is a subbasin of the Napa-Sonoma Valley basin. The subbasin occupies a lowland area immediately north of San Pablo Bay. The subbasin is bounded to the north by the Mayacmas Mountains. The Sonoma and Napa Valleys bound it to the northeast and northwest, respectively. The southern extent of the subbasin constitutes tidal marshlands lying near or below sea level. The marshlands merge with alluvial plains of the Napa and Sonoma valleys to the north. These marshlands are incised with numerous winding tidal channels containing brackish water (Kunkel and Upson, 1960).

The Napa River tidally influenced throughout its entire reach, and several tributaries including Suscol, Carnernos, and Huichica creeks drain the subbasin. The annual precipitation ranges from 20 to 24 inches over most of the basin, but exceeds 24 inches at the northern margin (USDA, 1999).

Hydrogeologic Information

The primary water-bearing formations include the Recent and Pleistocene alluvial deposits and the Pleistocene Huichica formation (Kunkel and Upson, 1960).

Water Bearing Formations

Recent Alluvium. The younger alluvium is of late Pleistocene to Recent age (Kunkel and Upson, 1960). It consists of interbedded deposits of unconsolidated gravel, sand, silt, clay and peat. The younger alluvium underlies the channels, flood plain deposits, and salt marsh deposits north of San Pablo Bay. The Recent Alluvium overlies all other formations of the Napa Sonoma Lowlands subbasin. Limited well data indicate an alluvial thickness ranging from 50 to at least 120 feet. Generally unconfined, the younger alluvium yields water freely to wells where saturated, however the thickness of the deposit may be insufficient for large well yields (Kunkel and Upson, 1960).

Pleistocene Alluvium. The older alluvium is of late Pleistocene age. It consists of unconsolidated,
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poorly sorted clay, silt, sand, and gravel. It generally overlies the Huichica formation and underlies the younger alluvium. The older alluvium is composed of stream channel and alluvial fan deposits. The older alluvium has a maximum thickness of 500 feet. Water in the older alluvium is unconfined to semi-confined. Lenses of gravel or clay and gravel yield moderate amounts of water, however, wells yielding more than 50 gpm are rare (Kunkel and Upson, 1960).

Pleistocene Huichica Formation. The Huichica formation is of Pleistocene age and composed of deformed continental beds consisting primarily of yellow silt, with some interbedded lenses of silt and gravel or silt and boulders. The Huichica underlies the older and younger alluvium. The basal 200 to 300 ft are beds of reworked volcanic material (pumice and tuff, interbedded with coarse andesitic gravel or cobbles), silt, clay and lenses of coarse gravel and boulders. The total thickness of the Huichica formation is at least 900 ft. Its permeability is low and generally yields insufficient water even for domestic needs (Kunkel and Upson, 1960).

Groundwater Level Trends. Insufficient data exists to determine current groundwater level trends for this subbasin.

Groundwater Storage

Groundwater Storage Capacity. There are no published reports addressing the groundwater storage capacity for the Napa-Sonoma Lowlands subbasin.

Groundwater in Storage. There are no published reports, which discuss groundwater in storage for the Napa-Sonoma Lowlands subbasin.

Groundwater Quality

Characterization. Water within the unconfined alluvium is generally salty (having a chloride concentration greater than 250 ppm) (Kunkel and Upson, 1960). Salinity seems to increase with increasing depth to at least 300 feet (Kunkel and Upson, 1960). Water of the Huichica formation is mostly soft and relatively high in bicarbonate. The water is generally usable for most domestics and irrigation needs, but may be locally unsatisfactory (Kunkel and Upson, 1960).

Impairments. Irrigation wells completed to the immediate west and northwest of the Napa-Sonoma Valley subbasin (within the Sonoma Valley subbasin) yielded water of satisfactory quality when first drilled.

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Heavy summer pumping caused an inflow of brackish water to the wells from the tidal sloughs, resulting in chloride concentrations above the acceptable limits for irrigation in some wells (Kunkel and Upson, 1960).

Groundwater Budget (Type C). Not enough data exists presently to provide either an estimate of the Napa-Sonoma Lowlands subbasin's groundwater budget or the groundwater extraction from the basin.

Well Production Characteristics

Well Yields: (gal/min)	Municipal/Irrigation: Range: 3 – 300 Average: 98 (17 Well Completion Reports)		
Production	Total depths of completed wells		
Depths: (ft)	Domestic: Range: 65 - 580	Average: 228	(Based on 57 Wells)
	Municipal/Irrigation: Range: 90 - 550	Average: 258	(Based on 19 Wells)

Active Monitoring Data

Agency	Parameter	Number of Wells /Measurement Frequency
	Groundwater levels	
	Miscellaneous water quality	
Department of Health Services and cooperators	Title 22 water quality	9 Wells

Basin Management

Groundwater Management:	
Water Agencies: Public	American Canyon County W.D., American Canyon County W.S.A., City of Napa W.S.A., Congress Valley W.D., Los Carnernos W.D.
Private	

References Cited

Kunkel, Fred and J.E, Upson. *Geology and Ground Water in the Napa and Sonoma Valleys, Napa and Sonoma Counties, California*. US Geological Survey Water Supply Paper 1495, 1960

USDA. *United States Average Annual Precipitation, 1961-1990: Map Layer*, 1999

Additional References